

# The Opisthobranch Mollusks of Humboldt County, California

by

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*Abstract.* Sixty-eight species of opisthobranch Mollusca are documented from twenty-one collection sites in Humboldt County, California. The sighting of *Hancockia californica* represents a geographical range extension. Aspects of the biology of certain species are discussed.

## INTRODUCTION

SINCE 1968, MANY annotated checklists and natural history reports discussing the opisthobranch gastropods from California counties and other geographical localities have been published (SPHON & LANCE, 1968; ROLLER & LONG, 1969; ROLLER, 1970b; GOSLINER & WILLIAMS, 1970, 1973b; BERTSCH *et al.*, 1972; HOLLEMAN, 1972; GODDARD, 1973; BEHRENS & TUEL, 1977; NYBAKKEN, 1978; BEHRENS, 1980b). From these reports, our knowledge of these mollusks has increased greatly, but none of these works examines the opisthobranch fauna from areas north of Marin County, California (latitude 38°17'38"N; longitude 123°00'05"W). As a result, the opisthobranch fauna of northern California is poorly documented and the number of publications dealing specifically with the opisthobranch gastropods of Humboldt County is extremely limited. WICKSTEN & DEMARTINI (1973) described a new anthozoan prey species of the dendronotacean nudibranch *Tochuina tetraquetra* (Pallas, 1788) from Trinidad Bay; McDONALD (1977) noted a photograph of *Crimora coneja* Marcus, 1961, reportedly from Humboldt County; and JAECKLE (1981a, b) reported geographical range extensions for several nudibranch species. Three marine biota surveys have been conducted in certain littoral and sublittoral localities in Humboldt County (BOYD & DEMARTINI, 1977; BOYD, 1979; BOYD & SJOGREN, 1979), and these list the opisthobranch species from their respective areas.

This paper presents the results of a three-year examination of the gastropod subclass Opisthobranchia in Humboldt County and a compilation of data from previously published works. Personal sightings have been augmented by specimens collected by the faculty and graduate students of the Department of Biological Sciences, Humboldt State University, Arcata, California.

Humboldt County (Figure 1) is located in northwestern California, and the coastline is characterized by rocky cliffs, expanses of rocky littoral areas, sandy beaches, and one major estuary, Humboldt Bay. A total of 57 collection trips, primarily during the months of June, July and August, were made at 14 collection sites; specimens supplied from additional localities and previously published accounts bring the cumulative total to 21 collection sites (Table 1; Figure 1). Topographically, these sites range from an area of extreme oceanic exposure (*e.g.*, North Jetty) through semi-protected rocky habitats (*e.g.*, Trinidad Bay) to calm, floating dock communities and *Zostera marina* beds of Humboldt Bay (*i.e.*, Fields Landing and the Somoa Boat Ramp).

## OCCURRENCE AND DISCUSSION OF HUMBOLDT COUNTY OPISTHOBRANCH MOLLUSKS

Except where noted, all examined specimens were collected from littoral localities. In only one instance was bathymetric data obtained for specimens collected in sublittoral areas, denoted by an (s). The sites of collection are keyed by numbers (Table 1) with each individual species in the list below. An asterisk (\*) denotes a geographical range extension; a (+) indicates that the collection data were obtained from the Humboldt State University marine invertebrate museum collection.

### CEPHALASPIDEA

#### ACTEONIDAE

*Rictaxis punctocaelatus* (Carpenter, 1864)  
7, 15.

## AGLAJIDAE

*Aglaja ocelligera* (Bergh, 1894)+  
8(s).

*Melanochlamys diomedea* (Bergh, 1894)+  
8(s).

## ANASPIDEA

## APLYSIIDAE

*Aplysia californica* Cooper, 1863

*Aplysia californica* is reportedly very common in the discharge canal of the Humboldt Bay Power Plant (David Behrens, Pacific Gas & Electric Company, personal communication); however, no specimens were sighted during this study.

*Phyllaplysia taylora* Dall, 1900

13, 17. *Phyllaplysia taylora* is commonly epiphytic on the marine angiosperm *Zostera marina* Linnaeus in Humboldt Bay. Nidosomes of *P. taylora* have been found on *Zostera* from May through October and young specimens are common in October and November.

## NOTASPIDEA

## PLEUROBRANCHIDAE

*Berthella californica* (Dall, 1900)

3, 4. Many members of the notaspidean family Pleurobranchidae are known to produce epidermal acidic secretions as an active defense mechanism (THOMPSON, 1976a). A field observation suggests that *Berthella californica* has the capacity to secrete a repellent material. At Palmer's Point (#4), a specimen of the carnivorous asteroid *Pycnopodia helianthoides* (Brandt, 1835) was observed crawling onto a specimen of *B. californica*. After approximately a 30-second time interval, the *Pycnopodia* specimen moved rapidly away from the pleurobranch. An examination of the area immediately following this interaction revealed no other organisms that could conceivably have elicited this response by the asteroid.

*Pleurobranchaea californica* MacFarland, 1966

19(s). One specimen collected by a commercial fisherman at 550 m depth.

## SACOGLOSSA

## STILIGERIDAE

*Alderia modesta* (Lovén, 1844)

9, 10, 11.

*Aplysiopsis smithi* (Marcus, 1961)

5. This sacoglossan species was feeding on an unidentified filamentous chlorophyte in a small supralittoral fringe tidal pool. Among the algal filaments were numerous nidosomes of *A. smithi* (shape of nidosome described by GONOR, 1961).

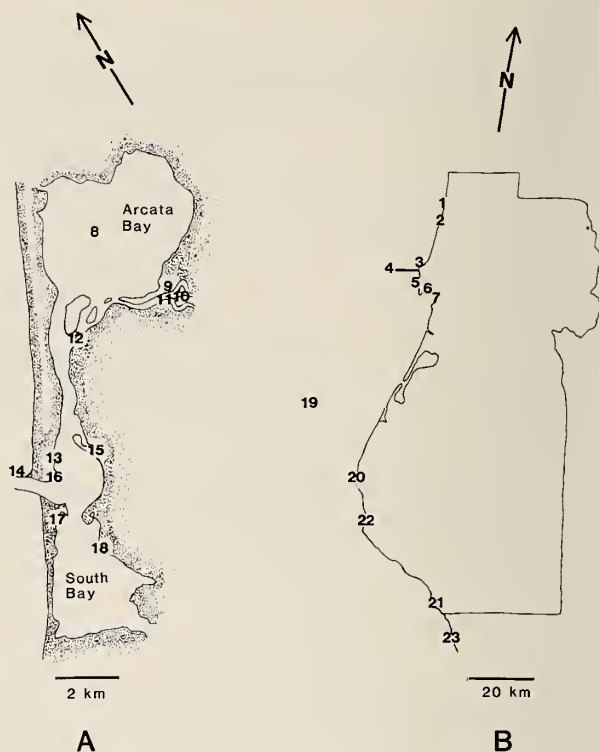


Figure 1

Humboldt County, California. Numbers indicate sites of collection (see text). A. Humboldt Bay; B. Humboldt County.

*Placida dendritica* (Alder & Hancock, 1843)

3, 6.

*Stiliger fuscovittatus* Lance, 1962

8.

## NUDIBRANCHIA

## Doridacea

## OKENIIDAE

*Ancula pacifica* MacFarland, 1905

3, 4, 16.

*Hopkinsia rosacea* MacFarland, 1905

4. A single specimen of this suctorian dorid was found on its prey, the bryozoan *Eurystomella bilabiata* (Hincks, 1884) (McBETH, 1971). The dorsal papillae of *H. rosacea* are reportedly tall, slender, and simple (BEEMAN & WILLIAMS, 1980; BEHRENS, 1980a; McDONALD & NYBAKKEN, 1980); however, many of this specimen's papillae were branched and/or apically bifurcated as described by MACFARLAND (1906).

## ONCHIDORIDIDAE

*Acanthodoris nanaimoensis* O'Donoghue, 1921

1-2, 4, 6, 6(s), 16.

Table 1  
Geographical localities.

	Latitude	Longitude
1-2 Redwood National Park	41°16'10"N	124°06'35"W
		to
3 Palmer's Point	41°22'41"N	125°04'12"W
4 Abalone Beach	41°07'21"N	124°09'32"W
5 Omenoku Point	41°07'20"N	124°09'32"W
6 Trinidad Bay	41°04'01"N	124°09'19"W
7 Luffenholtz Beach	41°03'07"N	124°07'51"W
8 Arcata Bay, Humboldt Bay (=North Bay of JAECKLE, 1981b)	41°02'51"N	124°07'04"W
9 Freshwater Slough	~40°51'N	~124°08'W
10 Park Street Marsh	40°48'17"N	124°07'W
11 Park Street Slough	40°48'17"N	124°07'W
12 Eureka Boat Harbor	40°48'15"N	124°10'41"W
13 Somoa Boat Ramp	40°46'21"N	124°18'39"W
14 North Jetty	40°46'09"N	124°14'15"W
15 Elk River Slough	40°46'00"N	124°11'57"W
16 Humboldt Bay Coast Guard Station (HBCGS)	40°45'55"N	124°13'04"W
17 South Spit, South Bay, Humboldt Bay	40°44'00"N	124°12'31"W
18 Fields Landing	40°43'26"N	124°13'20"W
19 Eel River Submarine Canyon	~40°41'N	~124°40'W
20 Cape Mendocino	40°26'44"N	124°24'43"W
21 Point Delgada	40°01'27"N	124°04'17"W
22-23 King Range	40°19'38"N	124°20'14"W
		to
	39°59'38"N	123°59'46"W

*Acanthodoris rhodoceras* Cockerell in Cockerell & Eliot, 1905

16.

*Adalaria* sp.

16. The radular and external morphology of this onchidorididean species correspond with that of *Adalaria* sp. (BEHRENS, 1980a, fig. 138) and to a specimen supplied by Sandra Millen (University of British Columbia). The orange ground color of the specimens collected in Humboldt County differs significantly from the white coloration of northern forms. This species is found exclusively on the orange anascan cheilostome bryozoan *Lyrula hippocrepis* (Hincks, 1882), upon which it feeds. Nidosomes, deposited directly on *Lyrula*, have been found in August and October.

*Onchidoris bilamellata* (Linnaeus, 1767)

3, 4, 6(s), 16. This species was sighted on or near the barnacles *Balanus crenatus* Bruguire, 1789, or *B. glandula* Darwin, 1854. Nidosomes were found in littoral areas in January and July; a large sublittoral population in Trinidad Bay spawns in late summer (Tim Stebbins, University of Southern California, personal communication). HURST (1967) reported that nidosomes of *O. bilamellata* are extremely common in Washington during the winter months.

*Onchidoris hystricina* (Bergh, 1878)

3, 4, 6, 14, 16.

*Onchidoris muricata* (Müller, 1776)

4, 6, 16.

#### TRIOPHIDAE

*Triopha catalinae* (Cooper, 1863)

3, 4, 6, 6(s).

*Triopha maculata* MacFarland, 1905

3, 4, 6, 16.

*Crimora coneja* Marcus, 1961

This species was not sighted during the study; however, McDONALD (1977) noted a photograph of *Crimora coneja* reportedly from Humboldt County.

*Aegires albopunctatus* MacFarland, 1905

3, 4, 6(s).

*Laila cockerelli* MacFarland, 1905

4.

#### POLYCERIDAE

*Polycera atra* MacFarland, 1905

8.



*Polycera zosterae* O'Donoghue, 1924

14. On the bryozoan *Dendrobeatia laxa* (Robertson, 1905).

#### CADLINIDAE

*Cadlina flavomaculata* MacFarland, 1905

4.

*Cadlina luteomarginata* MacFarland, 1905

3, 4, 6, 6(s), 16.

*Cadlina modesta* MacFarland, 1966

4.

#### ACTINOCYCLIDAE

*Hallaxa chani* Gosliner & Williams, 1975

3, 4.

#### ALDISIDAE

*Aldisa cooperi* Robilliard & Baba, 1972

6.

*Aldisa sanguinea* (Cooper, 1863)

3.

#### ROSTANGIDAE

*Rostanga pulchra* MacFarland, 1905

1-2, 3, 4, 6, 6(s), 16, 22-23.

#### ARCHIDORIDIDAE

*Archidoris montereyensis* (Cooper, 1863)

1-2, 3, 4, 6, 6(s), 12, 16, 17. Specimens sighted in rocky littoral areas possessed the typical yellow to orange ground color with scattered black notal pigmentation. However, individuals examined from soft bottom areas of Humboldt Bay exhibited a dark yellow-brown to dark gray ground coloration. In several instances, the ground coloration was sufficiently dark to nearly obscure the black notal pigmentation.

*Archidoris montereyensis* has been seen feeding on the sponge *Halichondria panicea* (Pallas, 1766).

*Archidoris odhneri* (MacFarland, 1966)

6, 6(s).

#### DISCODORIDIDAE

*Anisodoris nobilis* (MacFarland, 1905)

3, 4, 6, 6(s), 16.

*Diaulula sandiegensis* (Cooper, 1863)

1-2, 3, 4, 6, 6(s), 14, 16, 22-23.

*Discodoris heathi* MacFarland, 1905

3.

#### DENDRODORIDIDAE

*Doriopsilla albopunctata* (Cooper, 1863)

4, 21.

Dendronotacea

#### TRITONIIDAE

*Tritonia diomedea* Bergh, 1894

6(s).

*Tritonia festiva* (Stearns, 1873)

1-2, 3, 4, 16, 21. In Humboldt County, *Tritonia festiva* exhibits two distinct coloration patterns. The dominant phase consists of the typical white ground color with a dorsal, reticulating, opaque white line network; a series of middorsal, oval pink spots is present on some individuals. Specimens collected at the HBCGS (#16) exhibited the alternate coloration, a translucent light pink ground color with little or no evidence of a dorsal, white line network. At this study site, a population of the pink alcyonacean octocoral *Gersemia rubiformis* (Pallas, 1788) exists and *T. festiva* preys on this anthozoan. The pink coloration of *Tritonia* does not appear to be restricted to the digestive tract as reported by GOMEZ (1973) for specimens of *T. festiva* feeding on *Lophogorgia chilensis* (Verrill, 1868). The feeding behavior differs from previously published accounts of tritonid feeding (GOMEZ, 1973; THOMPSON, 1976a). When *Tritonia* comes in contact with a *Gersemia* colony, the predator's oral veil expands laterally and the specimen lunges into the alcyonacean colony. The pink anthozoan tissue can be observed passing through the buccal mass into the esophagus. The calcareous spicules of *Gersemia* are present in the fecal pellets of pink specimens of *Tritonia*.

The utilization of *Gersemia rubiformis* as a prey item by *T. festiva* contradicts NYBAKKEN & MACDONALD (1981) who state "the unusually narrow radula of *T. festiva* seems to correlate with the prey" (in that case *Clavularia* sp.).

*Tochuina tetraquetra* (Pallas, 1788)

6, 6(s).

#### HANCOCKIIDAE

*Hancockia californica* MacFarland, 1923\*

6. This species was found exclusively on the rhodophyte *Polyneura* sp. attached to wharf pilings at this study site.

The sighting of *Hancockia californica* in Humboldt County represents a geographical range extension. The previous northernmost occurrence of *H. californica* was Dillon Beach, Marin County, California (MCDONALD & NYBAKKEN, 1980).

#### DENDRONOTIDAE

*Dendronotus diversicolor* Robilliard, 1970

6.

*Dendronotus frondosus* (Ascanius, 1774)

1-2, 3, 4, 6, 6(s), 12, 13, 16, 17, 18, 22-23.

*Dendronotus iris* Cooper, 1863

15.

*Dendronotus subramosus* MacFarland, 1966

3, 4, 6, 16. Observed feeding on the hydroids *Obelia* sp. and *Tubularia marina* (Torrey, 1902).

Table 2  
Hydrozoan prey species of *Hermisenda crassicornis*.

Anthomedusae	Leptomedusae	Chondrophora
<i>Eudendrium californicum</i>	<i>Abietinaria abietina</i> (Linnaeus, 1758)	<i>Velella velella</i> Linnaeus, 1758
<i>Eudendrium rameum</i> (Linnaeus, 1758)	<i>Abietinaria greeni</i> (Murray, 1860)	
<i>Stauridiosarsia japonica</i> (Nagao, 1962)	<i>Campanularia ritteri</i> Nutting, 1901	
<i>Tubularia crocea</i>	<i>Halecium corrugatum</i> Nutting, 1899	
<i>Tubularia marina</i>	<i>Obelia dichotoma</i>	
<i>Polyorchis</i> sp.	<i>Sertularella conica</i> Allman, 1877	

## DOTIDAE

*Doto amyra* Marcus, 1961

1-2, 6. Although no specimens definitely assignable to *Doto amyra* were sighted during this study, BOYD & DEMARTINI (1977) and BOYD (1979) have reported this species from Humboldt County.

*Doto columbiana* O'Donoghue, 1921

12. Feeding on *Obelia* sp.

*Doto kya* Marcus, 1961

3, 4, 12, 16. ROLLER's (1970a) and McDONALD's (1975, 1977) work on the five species of *Doto* described by MARCUS (1961) and MACFARLAND (1966) resulted in the three currently recognized species of this genus in the northeast Pacific: *Doto amyra*, *D. columbiana*, and *D. kya*. However, McDONALD (1977) commented on the continued taxonomic confusion surrounding these five species, and BEEMAN & WILLIAMS (1980) reported on the difficulty of species identification. Specimens have been collected in Humboldt County which are morphologically identical to MARCUS' (1961) description of *D. amyra*, but the presence and distribution of black pigmentation on the cerata and dorsum indicate that these specimens are representatives of *D. kya*. Systematic revision is clearly needed.

*Doto kya* possesses a varied diet, utilizing *Abietinaria* sp., *Aglaophenia struthionides* (Murray, 1860), *Eudendrium californicum*, *Obelia dichotoma* (Linnaeus, 1758), *Plumularia* sp., and *Sertularella* sp. as prey. Nidosomes of *Doto* spp. have been found throughout the year in the hydrorhizal area of all species, except *E. californicum*.

## Arminacea

## ARMINIDAE

*Armina californica* (Cooper, 1863)

4. Although typically found on sandy mud bottoms (McDONALD & NYBAKKEN, 1980) in association with *Renilla* spp. and *Ptilosarcus gurneyi* (Gray, 1860) (MACFARLAND, 1966; McDONALD, 1977), the single specimen collected in Humboldt County was found in a rocky littoral habitat with no evidence of pennatulacean prey species in the area of collection.

This specimen's coloration deviated significantly from normal pigmentation patterns described for *Armina californica*. The dorsum was completely white with no evidence of light pinkish-brown or cream pigmentation.

## DIRONIDAE

*Dirona albolineata* MacFarland in Cockerell & Eliot, 1905

1-2, 4, 6, 6(s), 14, 16, 22-23.

*Dirona picta* MacFarland in Cockerell & Eliot, 1905

1-2, 3, 4, 6, 14, 16, 22-23.

## JANOLIDAE

*Janolus fuscus* O'Donoghue, 1924

3, 4, 6, 13, 16, 22-23.

## Aeolidacea

## FLABELLINIDAE

*Flabellina iodinea* (Cooper, 1863)

6(s).

*Flabellina pricei* (MacFarland, 1966)

1-2, 6. No specimens of this species were sighted during this study; however, BOYD & DEMARTINI (1977) and BOYD (1979) reported *Flabellina pricei* from Humboldt County.

*Flabellina trilineata* (O'Donoghue, 1921)

1-2, 4, 5, 6, 13, 16.

## EUBRANCHIDAE

*Cumanotus beaumonti* (Eliot, 1906)

17. When disturbed, the cerata of the examined specimen moved in a coordinated dorso-ventral fashion; THOMPSON (1976b) depicts this defensive swimming behavior.

*Eubranchus rustys* (Marcus, 1961)

3, 4, 6, 12, 16.

## TERGIPEDIDAE

*Cuthona abronia* (MacFarland, 1966)

4.

*Cuthona albocrusta* (MacFarland, 1966)

3, 4, 6, 13.

*Cuthona cocoachroma* Williams & Gosliner, 1979  
6, 16.

*Cuthona columbiana* (O'Donoghue, 1922)  
3, 6.

*Cuthona divae* (Marcus, 1961)  
3, 4, 6, 16. In Humboldt County, this species is invariably found in close association with its food source *Hydractinia milleri* Torrey, 1902 (McDONALD & NYBAKKEN, 1980). Numerous pink nidosomes have been found on the perisarc of *H. milleri*, presumably deposited by adjacent specimens of *C. divae*. The deep pink ceratal coloration of these specimens is probably attributable to ingested *H. milleri* polyps.

*Cuthona flavovulta* (MacFarland, 1966)  
3, 4, 6.

*Cuthona lagunae* (O'Donoghue, 1926)  
3, 4, 6.

#### FACELINIDAE

*Hermisenda crassicornis* (Eschscholtz, 1831)  
1-2, 3, 4, 6, 6(s), 8, 12, 13, 14, 16, 17, 18, 22-23. In terms of abundance and geographical distribution, *Hermisenda crassicornis* is the dominant littoral opisthobranch in Humboldt County. During this study, *H. crassicornis* has been observed feeding on numerous hydrozoan species (Table 2).

#### AEOLIDIIDAE

*Aeolidia papillosa* (Linnaeus, 1761)  
1-2, 3, 4, 6, 12, 14, 16, 20.

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